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ABSTRACT

This unit is designed to acquaint elementary students with the way a computer operates and the way people communicate with computers. The format of the unit was designed so that the instruction can be provided by the classroom teacher. The lessons are constructed so that, with some teacher guidance, the students can work through them step by step. Follow-up activities for each lesson provide students with an opportunity to apply what they have learned in the lesson sequence. Challenge assignments provide additional stimulation for students who learn the language more quickly than others. Included in this document are parts one and two of the "Starting Apple LOGO" program and 15 task cards. The program includes five lessons and two sets of supplementary activities. (CW)

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STARTING APPLE LOGO, PART I

Spartanburg County School District No. 7
Spartanburg, South Carolina

1984

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STARTING APPLE LOGO, PART I

Developed by: Carol Ellis
Nan McDaniel

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Spartanburg County School District No. 7
Spartanburg, South Carolina

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NOTES FOR THE TEACHER

"Starting APPLE LOGO" is a unit designed to acquaint elementary stuents with the way a computer operates and the way people communicate with computers. The computer language LOGO was selected as the basis of the unit for four main reasons: 1) the basic vocabulary of the language is easy to learn; 2) the functions which LOGO makes the computer perform reinforce geometric concepts already in place in the regular math curriculum; 3) the student can feel power to control the machine early in experiences with the language; 4) use of LOGO stimulates both logical and creative thinking.

The format of the unit was designed so that the instruction can be provided by the classroom teacher. For those teachers who wish to teach the unit themselves, inservice in Apple LOGO will be provided by district consultants. The lessons are structured so that, with some teacher guidance, the students can work through them step by step. Follow-up activities for each lesson provide an opportunity for students to apply what they have learned up to that point in the lesson sequence. Challenge assignments provide additional stimulation for students who are picking up the language more quickly than others.

LESSON 1 SHOWTURTLE, FORWARD, BACK, LEFT, RIGHT, CLEARSCREEN, HIDETURTLE, HOME

HOW TO TURN ON THE COMPUTER

1. Find the disk named APPLE LOGO.
2. Hold the disk with the label up and your thumb on the label.
3. Put the disk carefully in the disk drive and close the door.
4. Check to be sure the CAPS LOCK key on the keyboard is down.
5. Switch on the monitor.
6. Reach behind the computer at the left side and turn on the switch.

When the red light on the disk drive is off, the display should say

```
PRESS THE RETURN KEY TO BEGIN.
IF YOU HAVE YOUR OWN FILE DISKETTE,
INSERT IT NOW, THEN PRESS RETURN.
```

Just press RETURN. When the red light goes off, the display will say

```
WELCOME TO LOGO
?
```

The blinking ▯ is called the cursor. The cursor tells you where the next letter you type will appear on the monitor.

Remove the APPLE LOGO diskette from the disk drive. Put it in the sleeve and store it as your teacher directs you.

THE SHOWTURTLE COMMAND

Type: SHOWTURTLE

and press RETURN.

SHOWTURTLE puts a triangle called "the turtle" in the center of the monitor. The cursor moves to the bottom section of the screen.

HOW TO MOVE THE TURTLE

When we say "enter," we will always mean to do these two things:

(1) type a line,
(2) then press RETURN.

Enter this line: FORWARD 50

What happened? _____

_____

Notice the Ø in FORWARD 5Ø on your monitor.

How is the Ø different from the O in FORWARD? _____

_____

The computer uses two different symbols so you will know whether you typed zero (Ø) or the letter O.

Enter this line: RIGHT 90
Did you remember to press RETURN?

What happened? _____

_____

Now enter these lines:

```
FORWARD 50
RIGHT 90
FORWARD 50
RIGHT 90
FORWARD 50
RIGHT 90
```

(Don't forget to press RETURN after each line.)

What did the turtle draw? _____

Now enter these lines:

```
BACK 50
LEFT 90
FORWARD 50
RIGHT 135
FORWARD 71
LEFT 45
```

What did the turtle add to the first drawing? _____

HOW TO CLEAR THE SCREEN

To try something new, you need to clear the screen. Enter the line

CLEARSCREEN

(Don't forget to press RETURN!)

The turtle is now in the HOME position.

The turtle can draw many geometric shapes. Some of these shapes are listed below. On the lines provided, write a definition of each shape.

square: _____

_____

rectangle: _____

_____

right angle: _____

_____

triangle: _____

_____

right triangle: _____

_____

isosceles triangle: _____

_____

equilateral triangle: _____

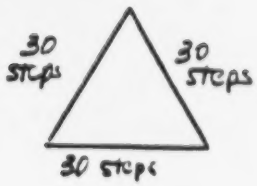
_____

scalene triangle: _____

_____

Exercise 1: Examine each shape below. Write each shape's geometric name on the line provided.

1.



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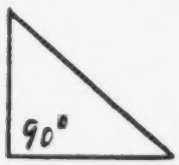
2.



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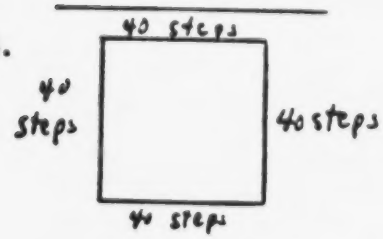
3.



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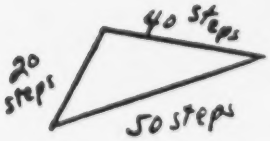
4.



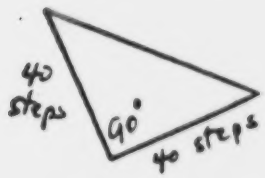
_____

5.

6.

7.

8.



USING SHORT NAMES FOR THE COMMANDS

You can enter lines a lot faster if you learn these short names for the basic LOGO commands:

FD = FORWARD
BK = BACK
RT = RIGHT
LT = LEFT
CS = CLEARSCREEN
ST = SHOWTURTLE

Enter these lines to see how the short names work.

```
FD 50
LT 30
BK 25
RT 60
FD 25
LT 30
BK 50
HT
```

What did the turtle draw? _____

What happened to the turtle? _____

What command made the turtle do this? _____

HT is the short name for HIDETURTLE. It makes the turtle disappear so you can see the whole drawing.

Can the turtle still draw even though you can't see it?

Enter BK 20

What happened? _____

What command do you enter to show the turtle? _____

Enter the short name for that command.

THE WRAP FEATURE

Clear your screen.

What happens when you enter FD 150? _____

_____

Now enter FD 25. What happens? _____

_____

This is called wraparound. It makes sure that the turtle returns to the screen. If you move too far to the right, it reappears on the left. If you move too far up, it reappears at the bottom of the screen. The wraparound feature limits the turtle to an area that is about 280 steps from left to right and 240 steps from top to bottom.

You can complete the line you've just begun by telling the turtle to return to HOME position.

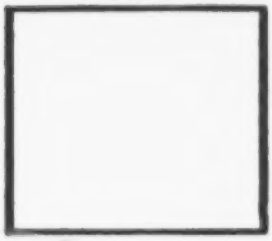
Enter HOME

Now clear the screen so you can try these assignments.

ASSIGNMENT 1: DESIGNS WITH THE TURTLE

Draw each of the following using FORWARD, BACK, RIGHT, and LEFT. Let your teacher initial your booklet before you clear the shape from your screen.

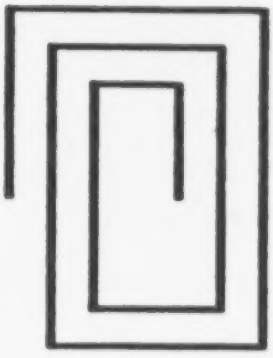
Square



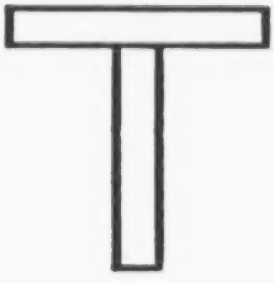
Rectangle

Stairs

Spiral



T



Golf Flag

A design of your own. Draw it here.

LESSON 2 PENERASE, PENUP, PENDOWN, CIRCLER, CIRCLEL

HOW TO ERASE AND DRAW WITH THE TURTLE

When you draw on paper, sometimes you need to erase. The turtle can erase, too. To see how the turtle erases, enter these commands:

```
FD  50
PENERASE
BACK  50
```

What happened? _____

When you want the turtle to go back over a line he has drawn and erase it, you use PENERASE.

Enter FD 50

What happened? _____

The turtle cannot draw again until you tell him to put his pen down. Enter these lines:

```
PENDOWN
FD  50
```

What happened? _____

Sometimes when you are drawing, you lift your pen off the paper and put it down again somewhere else. The turtle can do that, too. Clear your screen, then enter these lines:

```
PENUP
FD  50
```

When you enter PENUP, you tell the turtle to move without drawing a line. What command would you enter when you want the turtle to put his pen down to draw again?

_____

You can type the PENERASE, PENUP, and PENDOWN commands more quickly if you use the abbreviations:

```
PENUP   =  PU
PENDOWN  =  PD
PENERASE  =  PE
```

HOW TO MAKE CIRCLES WITH THE TURTLE

So far you have just drawn straight lines with the turtle. The turtle knows how to draw circles, too. He can draw a circle to the right with the command CIRCLER. He can draw a circle to the left with the command CIRCLEL.

Enter CIRCLER

What happened? _____

Enter CIRCLEL

What happened? _____

The turtle is trying to tell you he needs to know how big you want the circle to be.

Enter CIRCLER 10

Enter CIRCLER 50

Which circle is bigger? _____

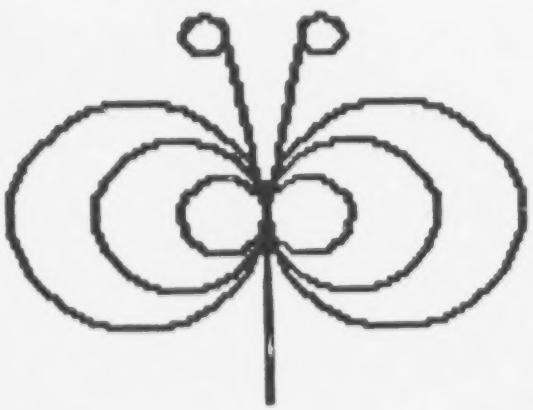
Exercise 2

Clear your screen and try making circles of various sizes. Use CIRCLER and CIRCLEL to make 5 circles on the screen. The circles may not touch or be connected in any way. They must all be completely on the screen. (They may not wrap.)

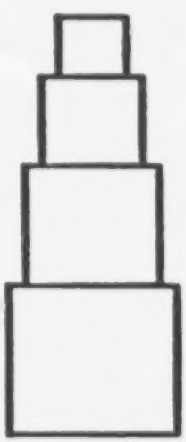
After you have practiced making circles, try these assignments. You will need to use all of the commands you have learned so far.

ASSIGNMENT 2: Draw each of the following designs. Let your teacher initial your booklet before you clear a completed design from your screen.

Butterfly

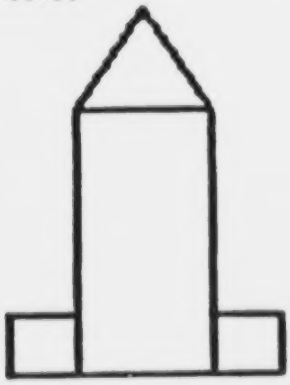


Blocks

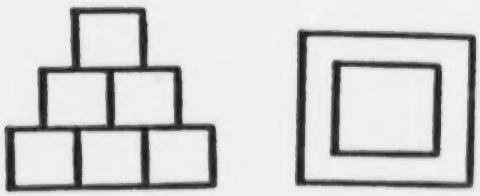


ASSIGNMENT 2A (continued)

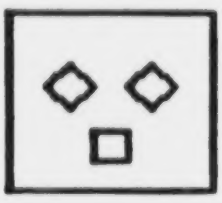
Rocket



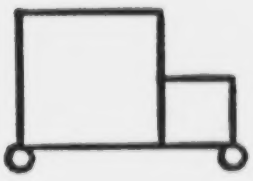
Blocks



Face



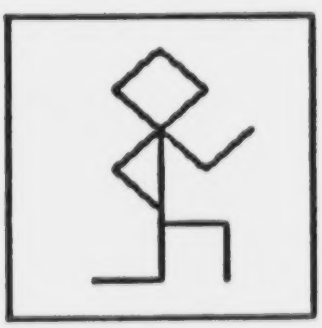
Truck



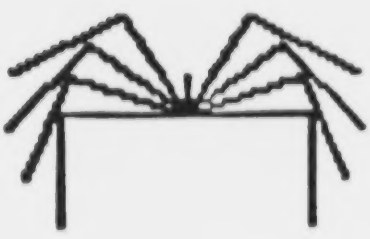
Man

Woman

Running Man



Spider

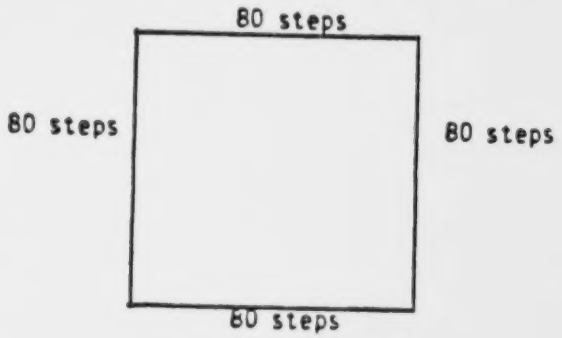


CHALLENGE 2A

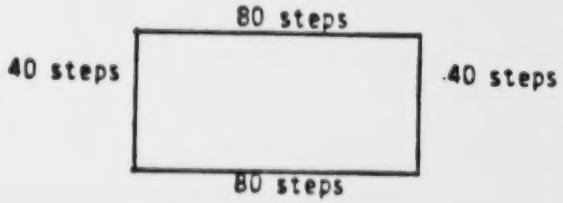
1. Make the turtle draw your initials.
2. Make the turtle draw a snowman and a Christmas tree.
3. Make the turtle draw 5 trucks, all different.
4. Make up your own design for the turtle to draw. Draw it here.

ASSIGNMENT 2B

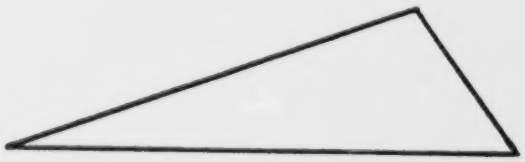
1. Make the turtle draw a square with side = 80 steps.



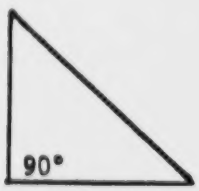
2. Make the turtle draw a rectangle with width = 40 steps and length = 80 steps.



3. A <u>scalene triangle</u> is a triangle with unequal sides. Make the turtle draw a scalene triangle. (Hint: To make the third side, remember where the turtle lives.)

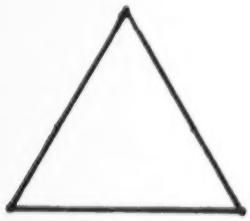


4. A <u>right triangle</u> is a triangle with 90 degree angle (turn). Make the turtle draw a right triangle.

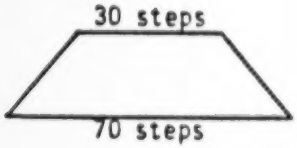


5. An isosceles triangle is a triangle with 2 sides the same length. Make the turtle draw an isosceles triangle.

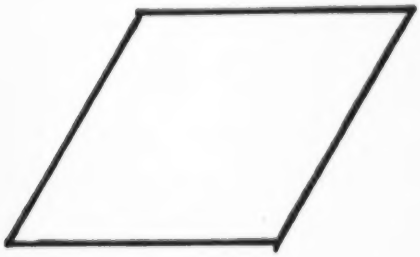
6. An equilateral triangle is a triangle with 3 sides the same length. Make the turtle draw an equilateral triangle.



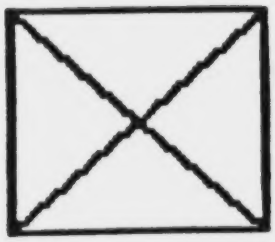
7. A trapezoid has 4 sides with only 2 sides parallel. Make the turtle draw a trapezoid. Make one of the parallel sides 30 steps long and the other parallel side 70 steps long. (Hint: Draw the 70-step side first.)

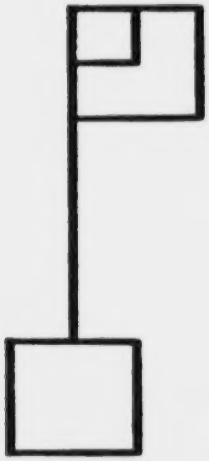


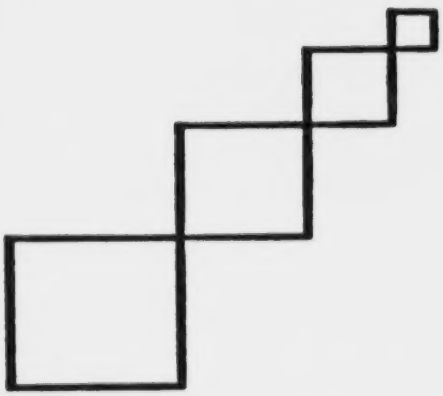
8. A rhombus has 4 equal sides. Make the turtle draw a rhombus.

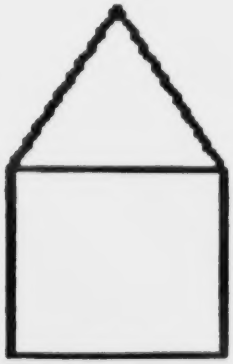


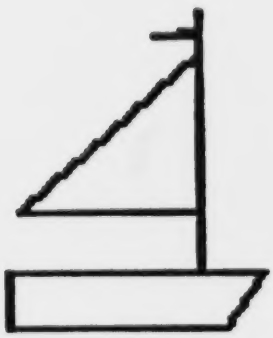
SUPPLEMENTARY ACTIVITIES











STARTING APPLE LOGO, PART II

Spartanburg County School District No. 7
Spartanburg, South Carolina

1984

STARTING APPLE LOGO, PART II

Developed by: Carol Ellis
Nan McDaniel

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REVIEWING COMMANDS

In Starting Apple LOGO, Part I, you learned how to command the turtle to build shapes.

What two commands make the turtle move across the screen? _____

_____

What two commands make the turtle turn in place? _____

_____

What command will show the turtle on the screen? _____

What command will hide the turtle? _____

What command will send the turtle back to the center of the screen? _____

What command will clear the screen? _____

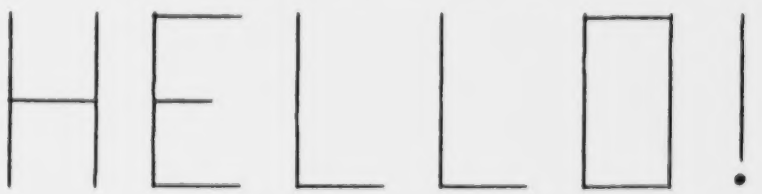
What command will allow the turtle to move without drawing? _____

What command will make the turtle draw again? _____

What command will make a circle to the right? _____

What command will make a circle to the left? _____

Assignment: Make the turtle write this message:



LESSON 3 PENERASE

HOW TO ERASE LINES THE TURTLE HAS DRAWN

The turtle knows how to move with its pen up so it does not draw. It knows how to put its pen down to draw. It also knows how to erase lines it has drawn.

Enter
```
BK 50
RT 90
FD 50
```

What kind of angle has the turtle drawn? _____

How do you know it is this kind of angle? _____

_____

Suppose you want to make the angle larger without clearing your screen.

Enter PENERASE

What happens? _____

Enter BK 50

What happens? _____

What do you think PENERASE means? _____

_____

Now that you have erased one side of the angle, you can turn the turtle more to the right to make the angle bigger.

Enter
```
RT 45
PD
FD 50
```

What happens? _____

What command made the turtle draw again? _____

How many degrees are in the angle altogether? _____

This kind of angle is called an obtuse angle. Any angle which has between 90° and 180° is obtuse.

Enter BK 50

Your turtle should now be at the vertex of the angle (where the two lines meet).

How many degrees do you have to turn the turtle to the right so that it is on the first side of the angle? _____ (Hint: Move the turtle 5 degrees at a time. Count the number of times you move it and multiply by 5.)

Add this number of degrees to the number of degrees in the obtuse angle. What is the sum? _____

Enter RT 360

What happens? _____

When you rotated the turtle, it circled in place. Every circle has 360°.

Clear your screen so you can try another kind of angle.

Enter BK 50
RT 90
FD 50

What kind of angle did the turtle draw? _____

Let's make the angle smaller without clearing the screen.

What command will tell the turtle to erase? _____

PE is the short name for this command.

Enter PE
BK 50

What happens? _____

Now you can move the turtle to the left to make the angle smaller.

Enter LT 60
PD
FD 50

What happens? _____

How many degrees do you think are left in the angle? _____

Enter BK 50

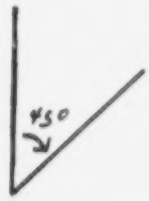
Now test your guess by turning the turtle left the number of degrees you guessed. If the turtle is back on the first side, your guess was accurate.

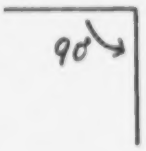
How many degrees are in the angle on the screen? _____

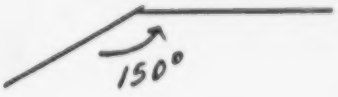
This kind of angle is called an <u>acute angle</u>. Any angle which has between 0° and 90° is acute.

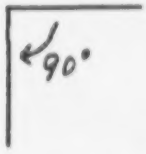
Clear your screen.

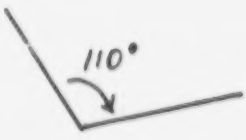
Exercise 3: Tell whether each of the following angles is right, obtuse, or acute.











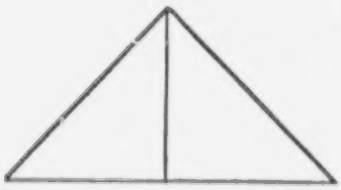
Assignment 3:

1. Make the turtle draw an acute angle. Sketch the angle and write the number of degrees.

2. Make the turtle draw an obtuse angle. Sketch the angle and write the number of degrees.

3. Make the turtle draw a right angle. Sketch the angle and write the number of degrees.

4. Have the turtle draw two right angles with a common side.



5. Have the turtle draw each of these shapes.

LESSON 4 LOAD " , ERALL

HOW TO USE NEW COMMANDS FROM A DISK

The turtle knows only a few words, but it can learn new words that are stored on a diskette. To learn what new words are on the diskette you are using, enter

CATALOG

What happens? _____

_____

You should see in the catalog that the diskette includes the new word rectangle and the new word triangle.

Enter RECTANGLE

What happens? _____

_____

Enter LOAD "RECTANGLE

When the light on the disk drive goes off, enter RECTANGLE.

What happens? _____

When you loaded rectangle, the disk drive read the definition of rectangle on the diskette. It put that definition in the machine's memory. So now the turtle knows how to rectangle.

What kinds of angles are in the rectangle? _____

Now enter TRIANGLE

What happens? _____

_____

Load triangle. Write here the command you use.

_____

Now enter TRIANGLE

What happens? _____

_____

Now the turtle knows how to triangle.

What kinds of angles are in the triangle? _____

Clear your screen.

Enter ERALL

What happens? _____

Enter RECTANGLE

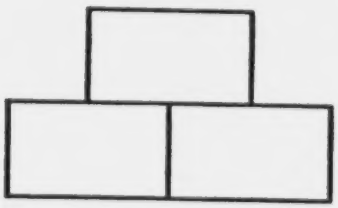
What happens? _____

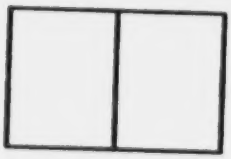
What do you think ERALL means? _____

ERALL is used to erase from memory things loaded from the disk.

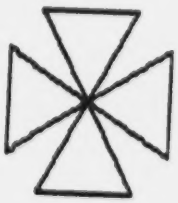
Assignment 4:

Load RECTANGLE and use it to build these figures:





Enter ERALL. Load TRIANGLE and use it to build these figures:



Your own design.

LESSON 5

In the last lesson you learned how to load new words from a disk. Load SQUARE from the file disk.

What command do you use? _____

HOW TO ROTATE A SHAPE

You can rotate or turn a shape by turning the turtle before you tell it to make the shape. You can make many designs by rotating basic shapes like the square.

```
Enter     SQUARE
          RT  90
          SQUARE
          RT  90
          SQUARE
          RT  90
          SQUARE
          RT  90
```

Sketch what the turtle draws.

How many degrees did you rotate the turtle each time? _____

What kind of angle did the turtle turn through? _____

Clear your screen. Let's try rotating the turtle a different number of degrees.

```
Enter     SQUARE
          LT  120
          SQUARE
          LT  120
          SQUARE
          LT  120
```

Sketch what the turtle draws.

How many degrees did you rotate the turtle each time? _____

What kind of angle did the turtle turn through? _____

Clear your screen.

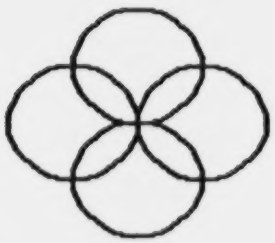
Make a design with SQUARE by rotating the turtle 45°. Continue to rotate the turtle and make squares until the turtle is back in its starting position. Sketch the design here.

What kind of angle did the turtle turn through? _____

Clear your screen. Enter ERALL to clear the memory.

Assignment 5:

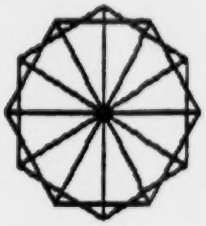
1. Have the turtle rotate and make circles to draw this design.



Write here the number of degrees you rotated the turtle each time. _____

Challenge: Use a different degree measure to rotate the turtle and create a new circle design. Draw the design below. Write the number of degrees you used here. _____

2. Load TRIANGLE. Use rotation and TRIANGLE to make these designs.

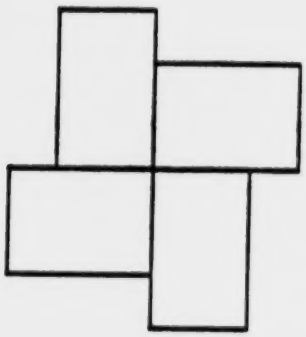


How many degrees did you rotate the turtle each time? _____

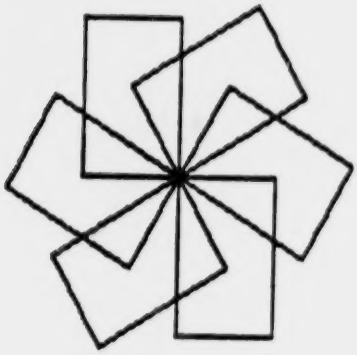
How many degrees did you rotate the turtle each time? _____

Challenge: Use a different degree measure to rotate the turtle and create a new design. Draw the design below. Write here the number of degrees you used. _____

3. Enter ERALL. Load RECTANGLE. Use rotation and RECTANGLE to make these designs.



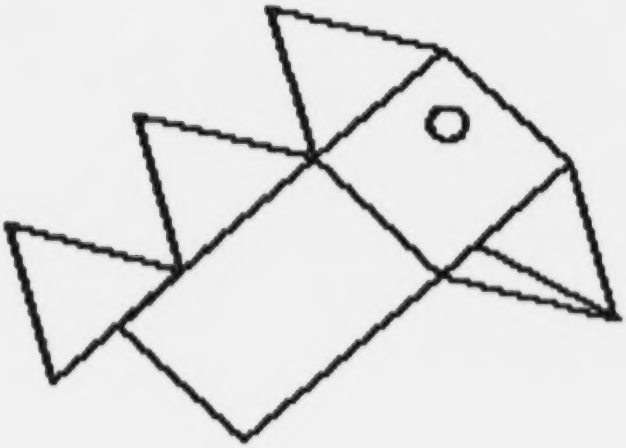
How many degrees did you rotate the turtle each time? _____

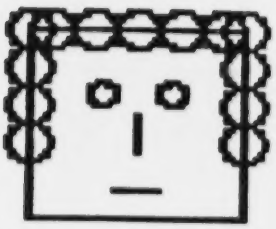


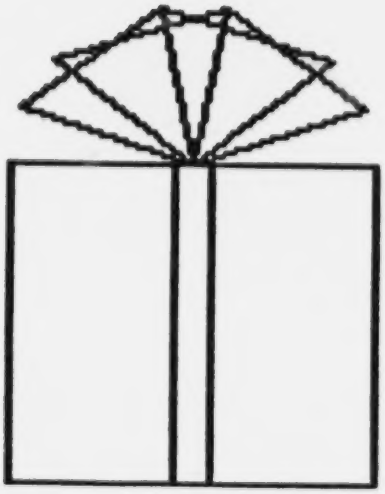
How many degrees did you rotate the turtle each time? _____

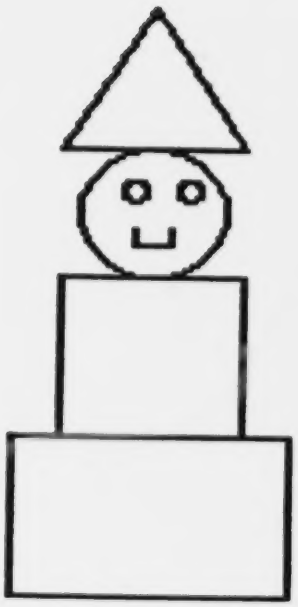
Challenge: Use a different degree measure to rotate the turtle and create a new rectangle design. Draw the design below. Write here the number of degrees you used. _____

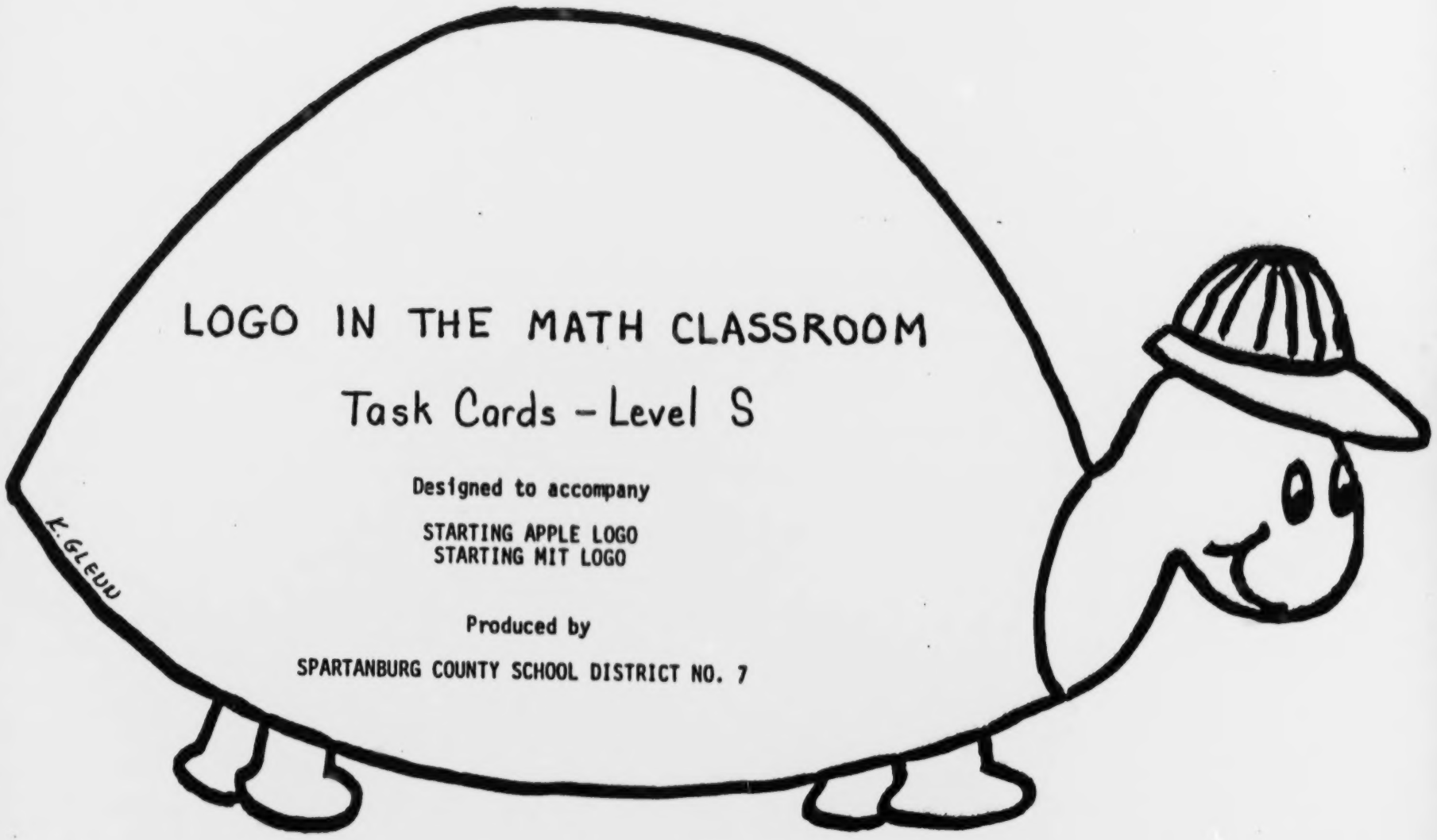
SUPPLEMENTARY ACTIVITIES











LOGO IN THE MATH CLASSROOM

Task Cards - Level S

Designed to accompany

STARTING APPLE LOGO
STARTING MIT LOGO

Produced by

SPARTANBURG COUNTY SCHOOL DISTRICT NO. 7

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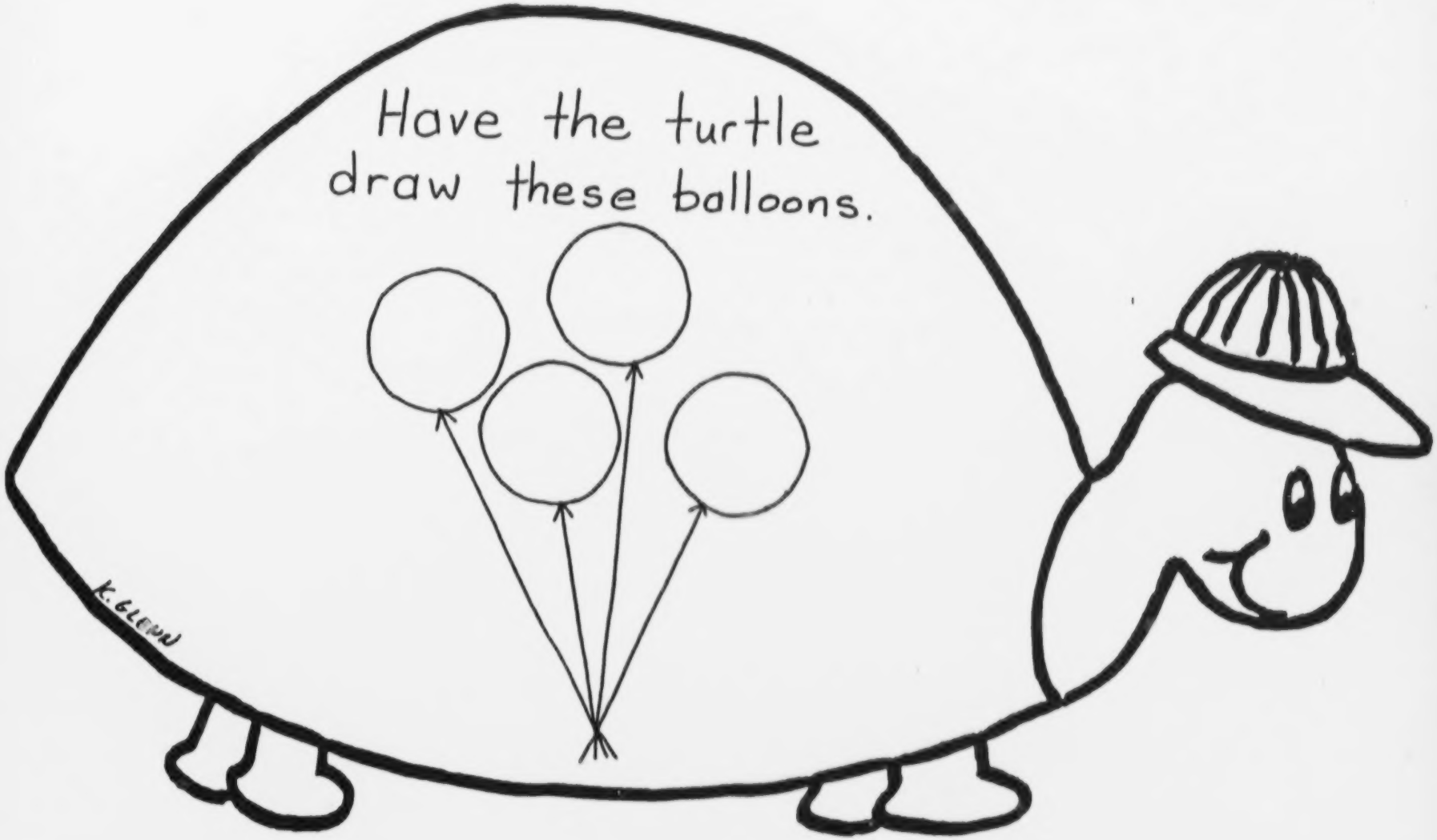

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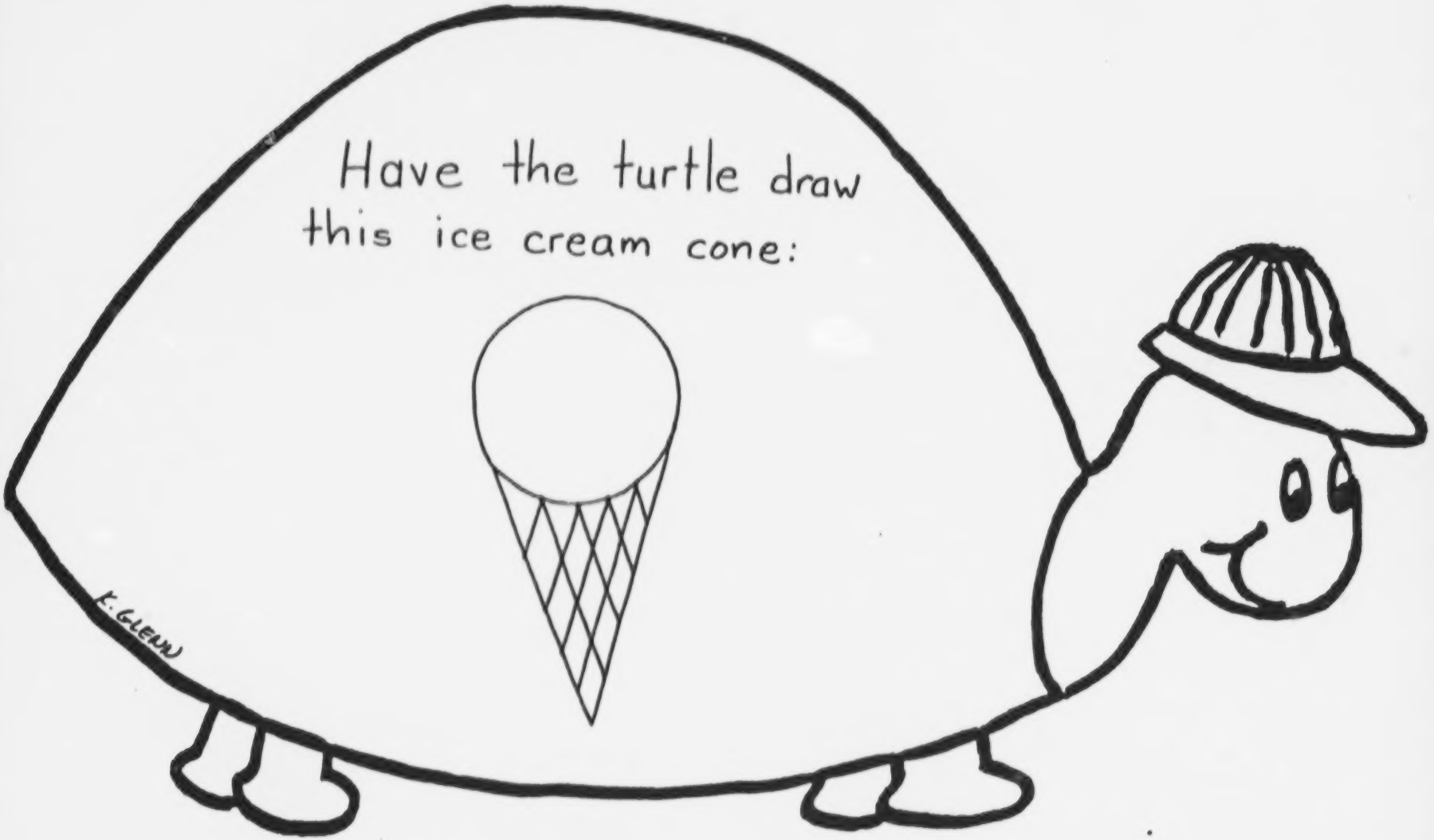
Have the turtle draw this ice cream cone:



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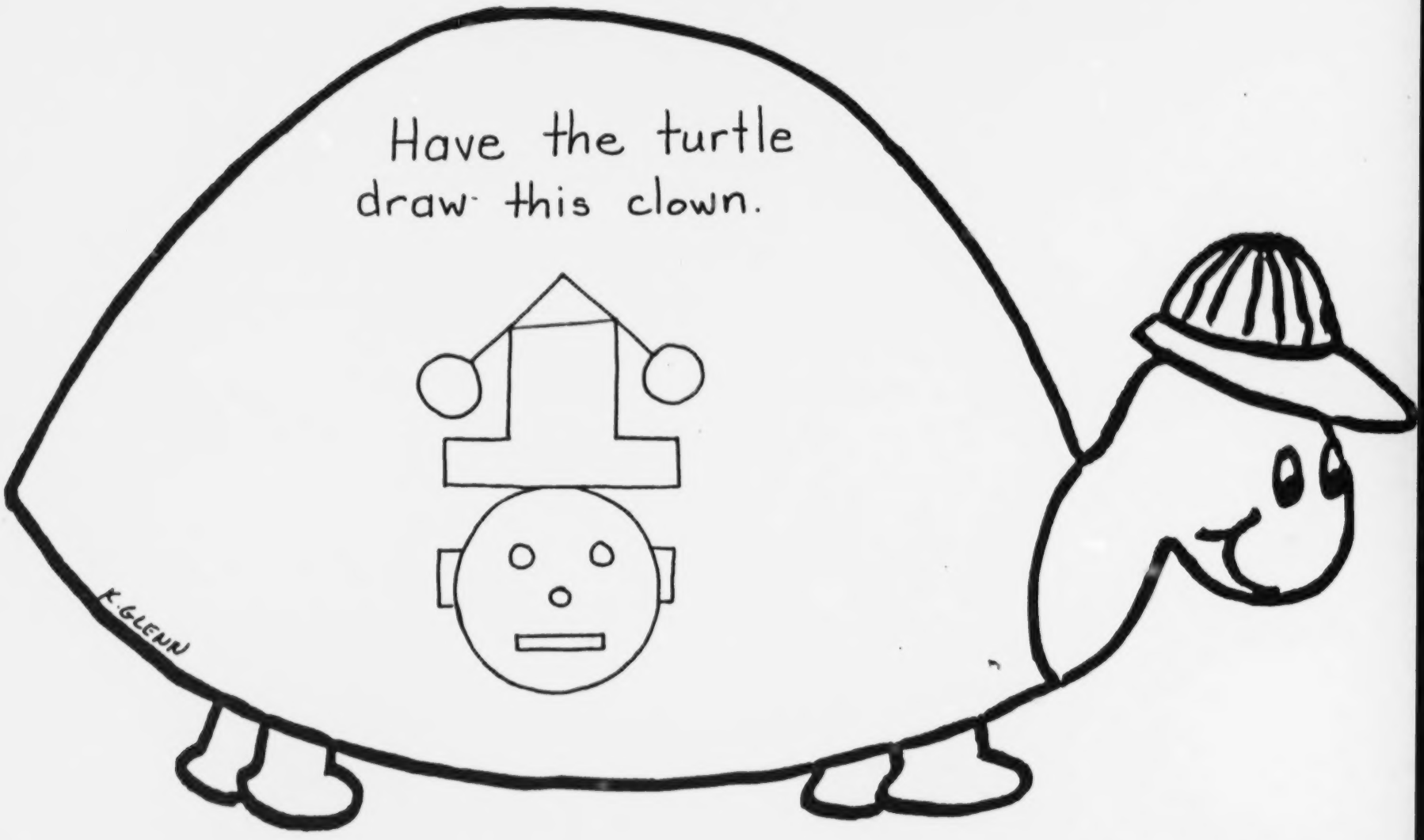

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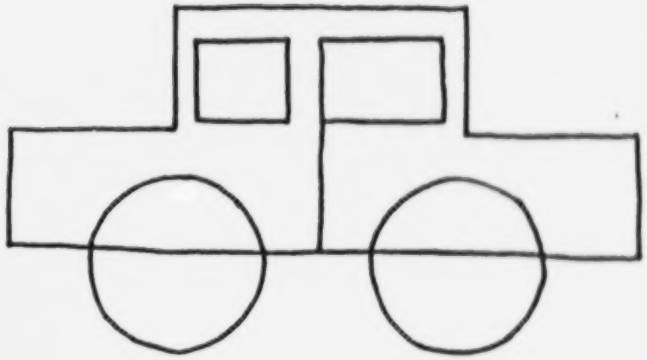
S-4

Have the turtle draw this car:



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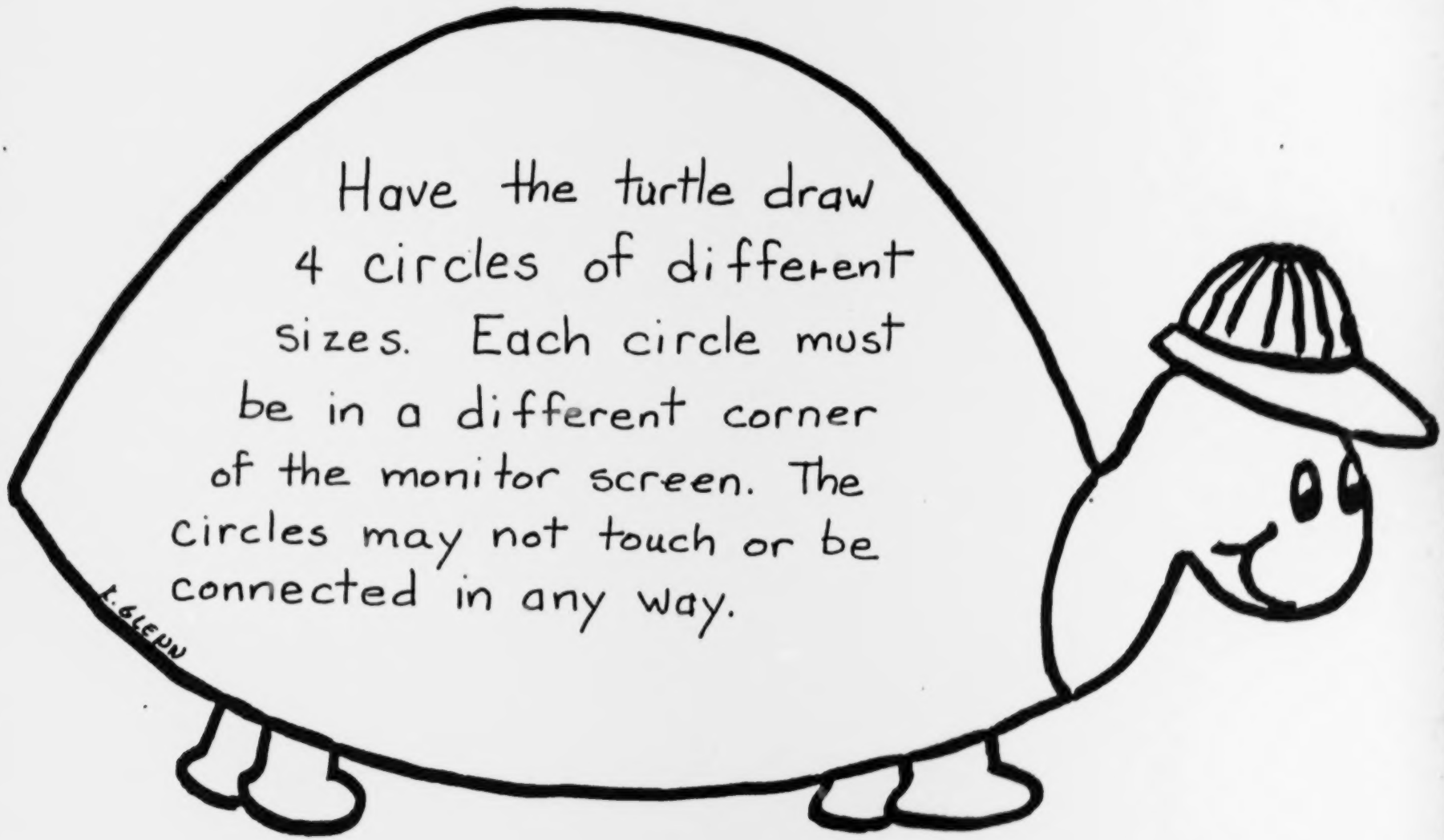
Have the turtle draw 4 circles of different sizes. Each circle must be in a different corner of the monitor screen. The circles may not touch or be connected in any way.

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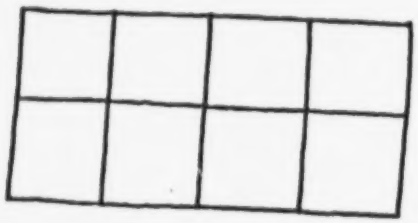
S-6

Have the turtle cover the screen with adjoining squares, so it looks like this:



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LOGO IN THE MATH CLASSROOM

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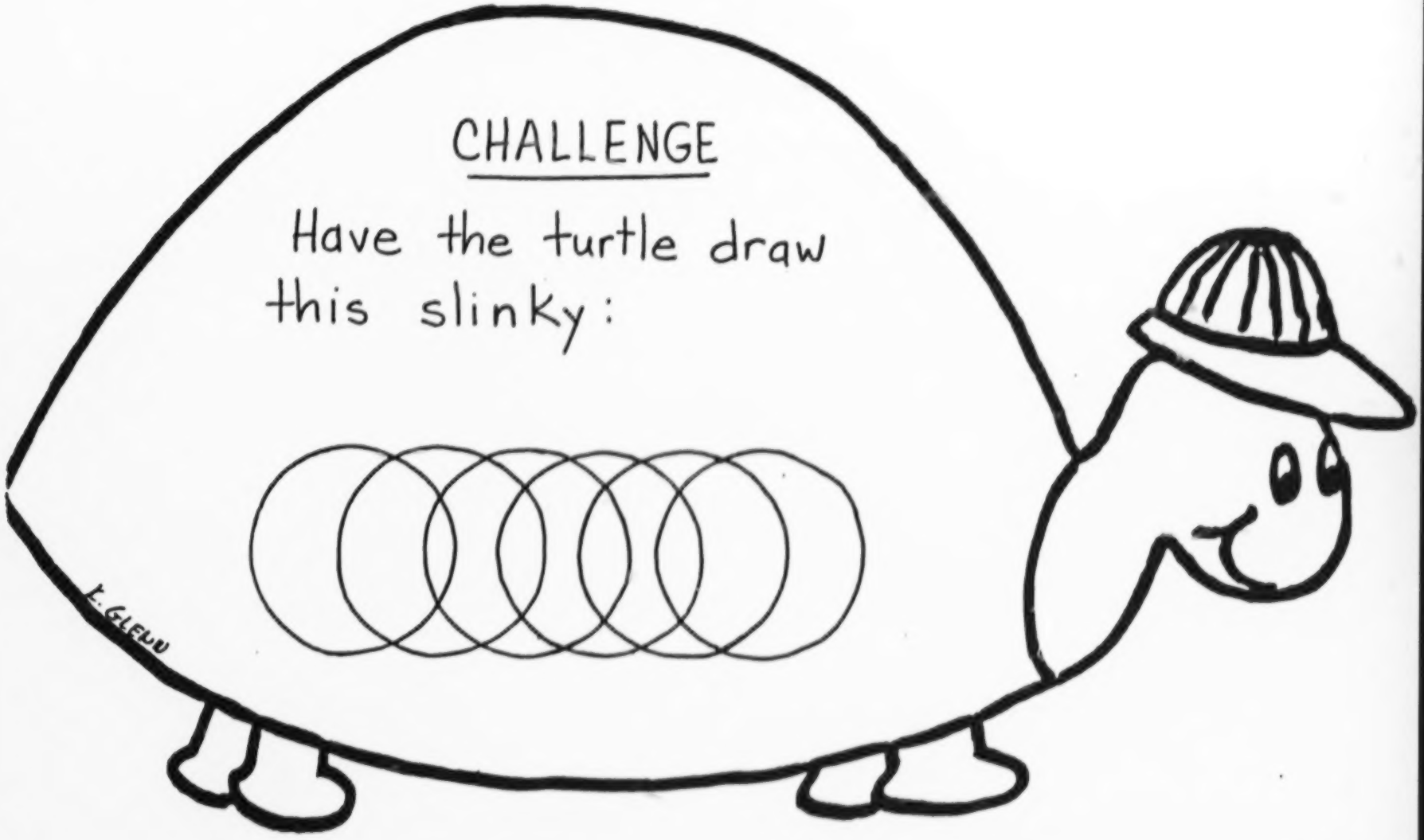
CHALLENGE

Have the turtle draw this slinky:



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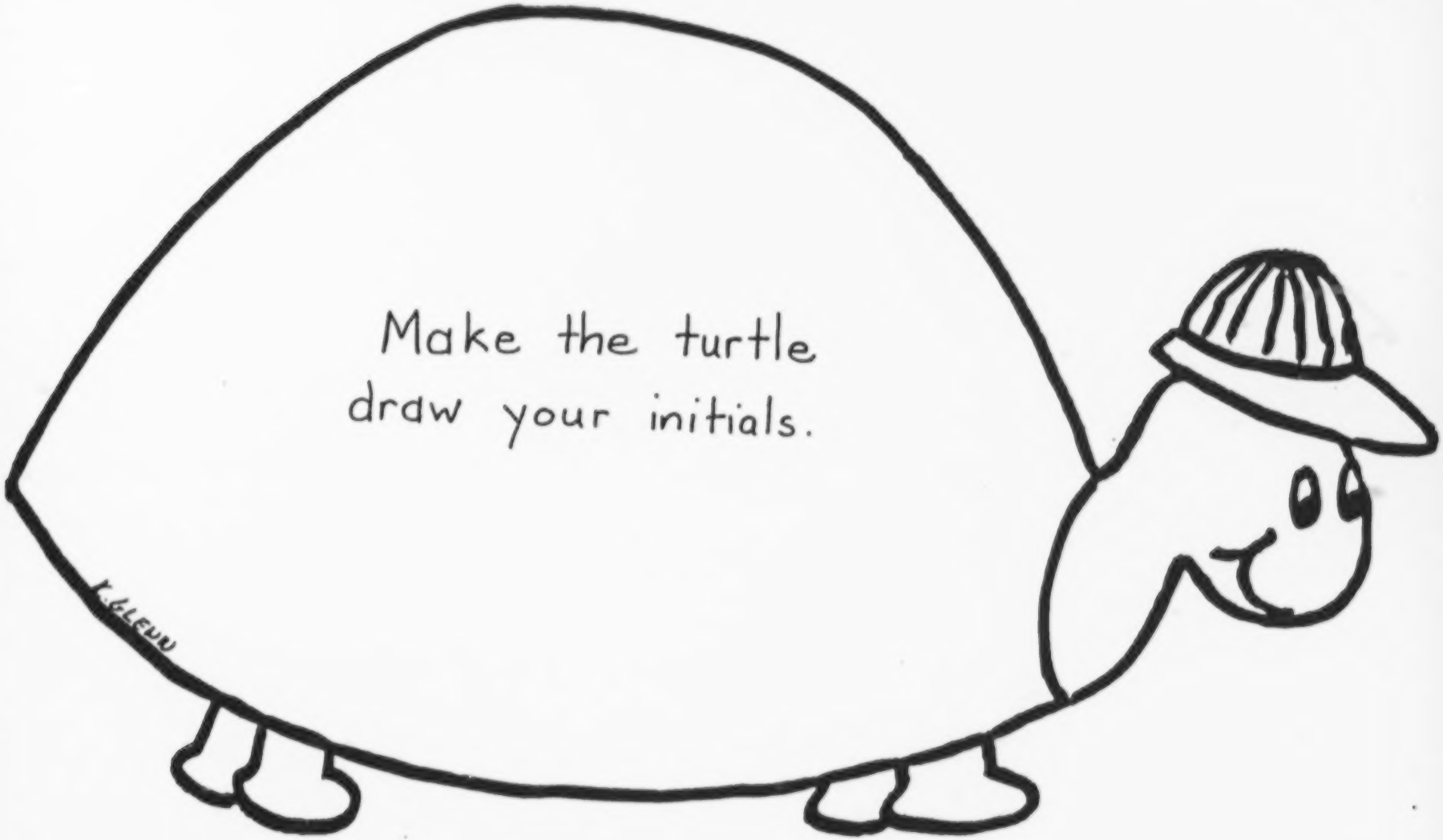
S-8



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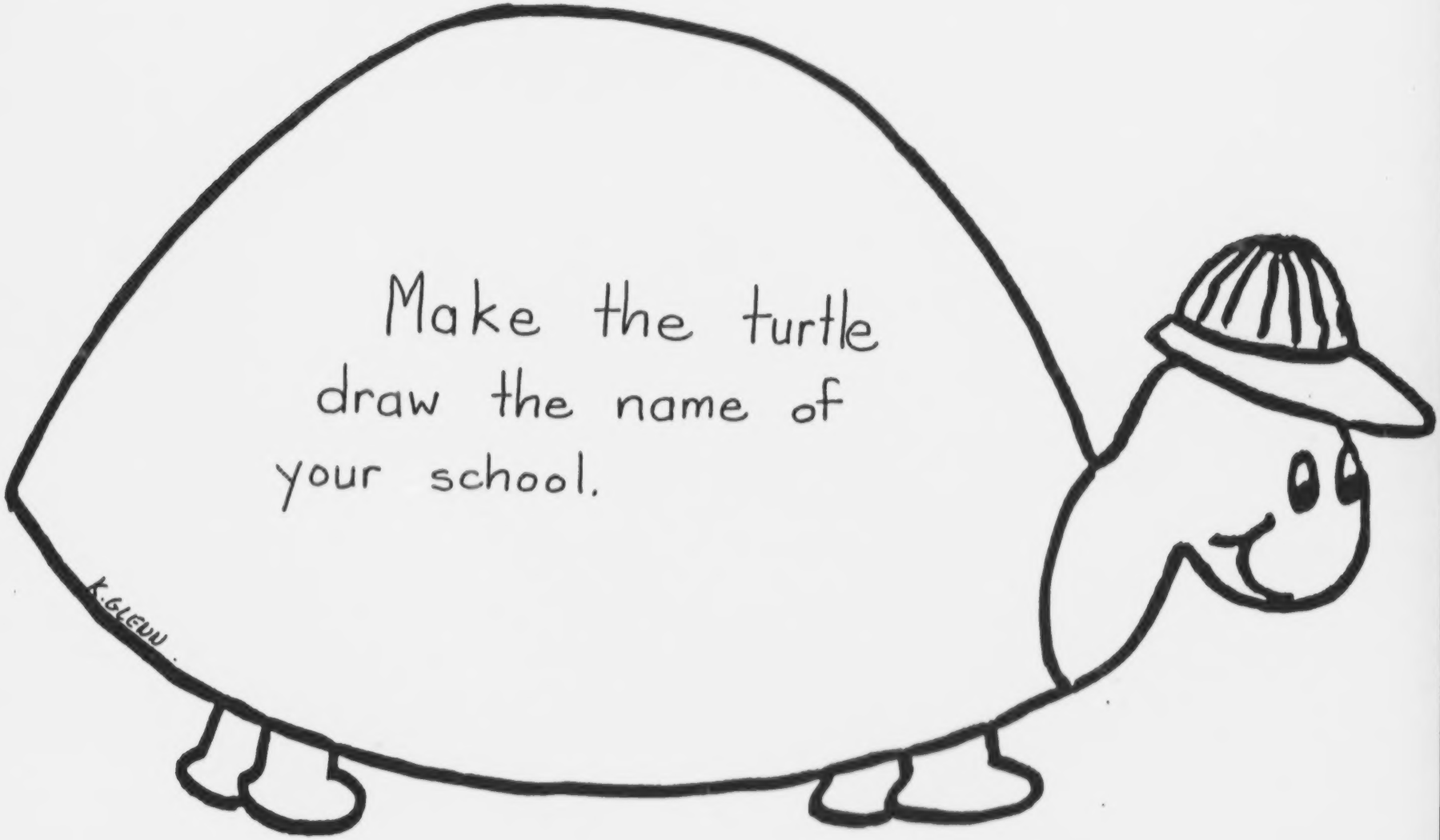
S-9



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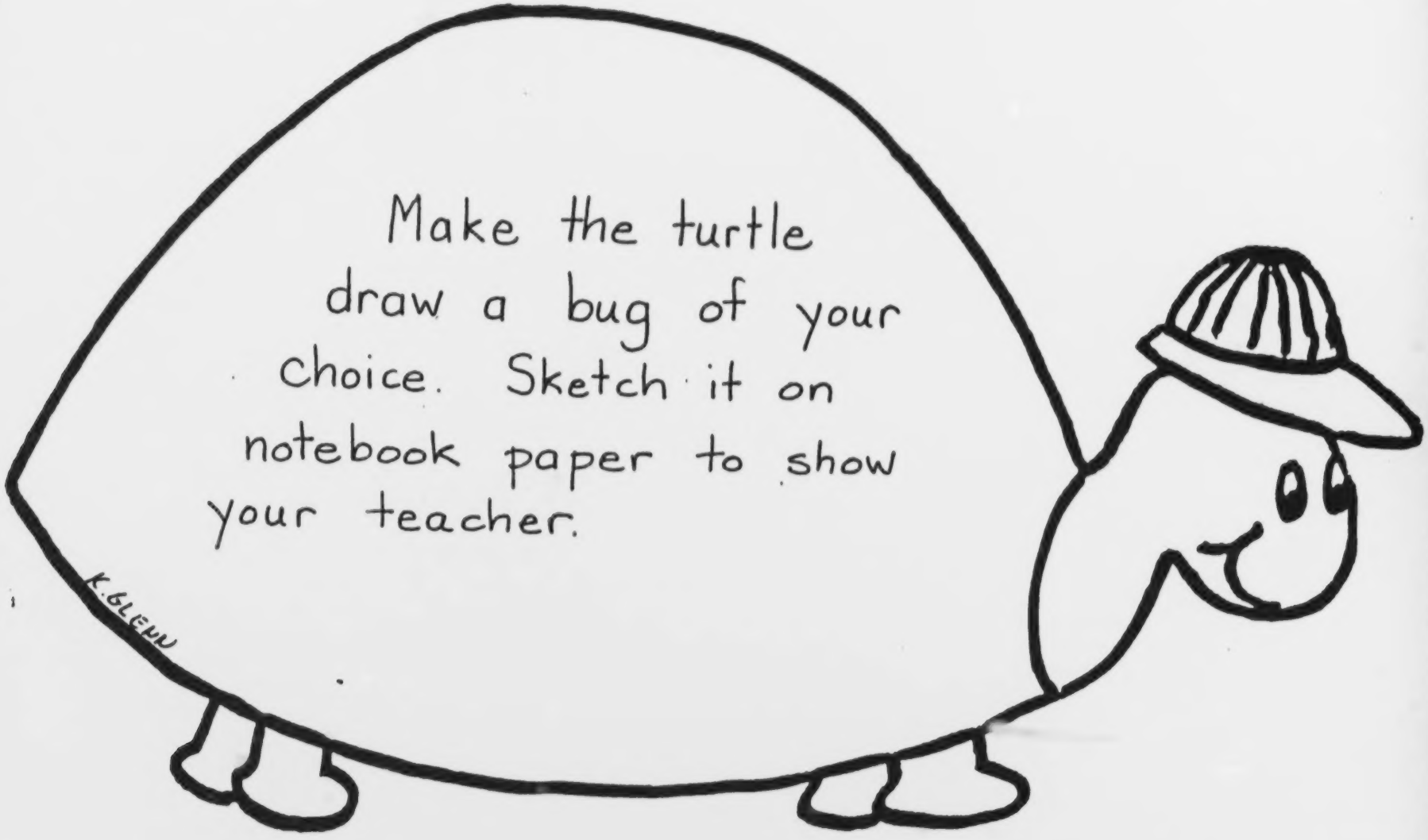
S-10



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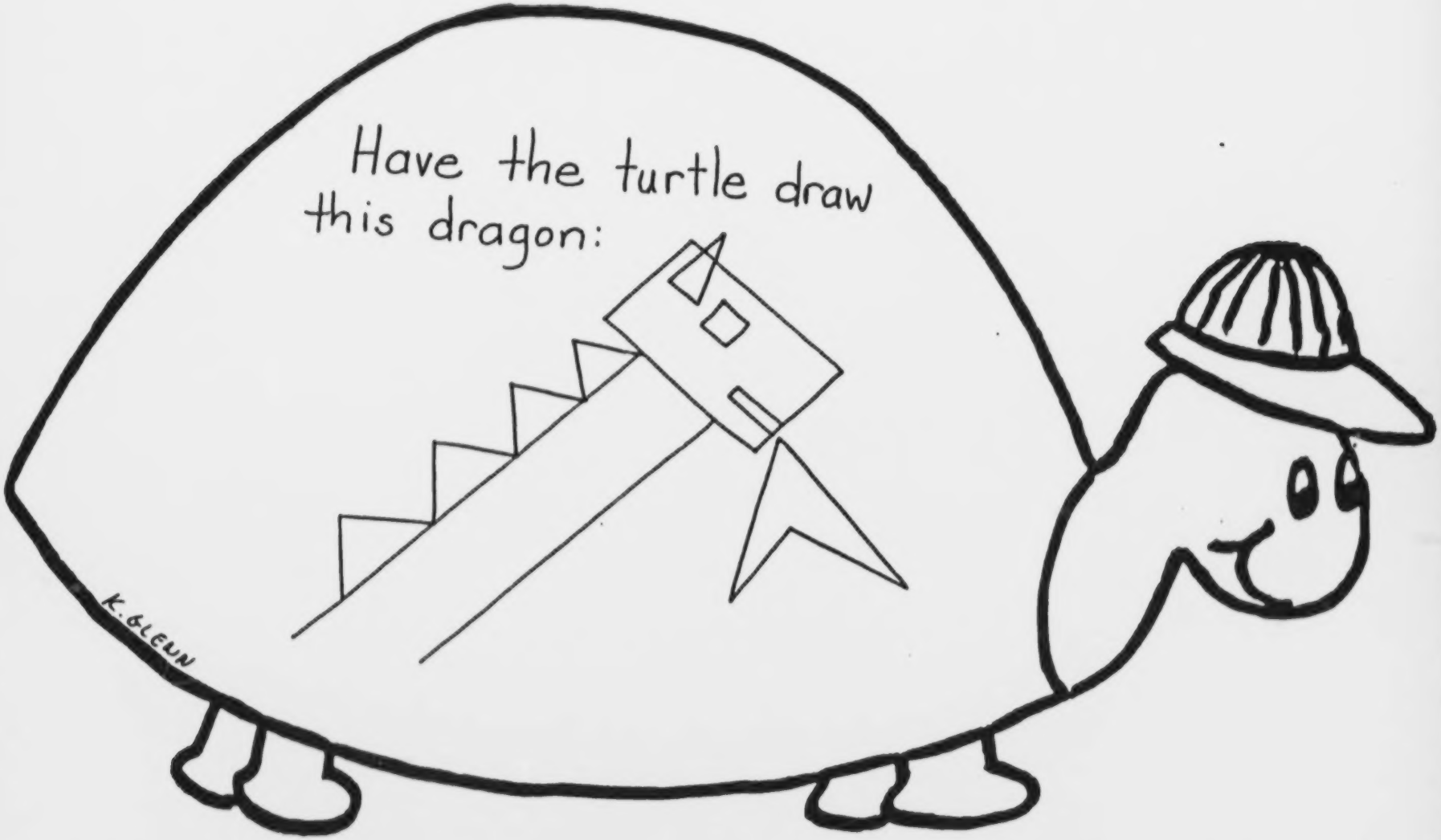

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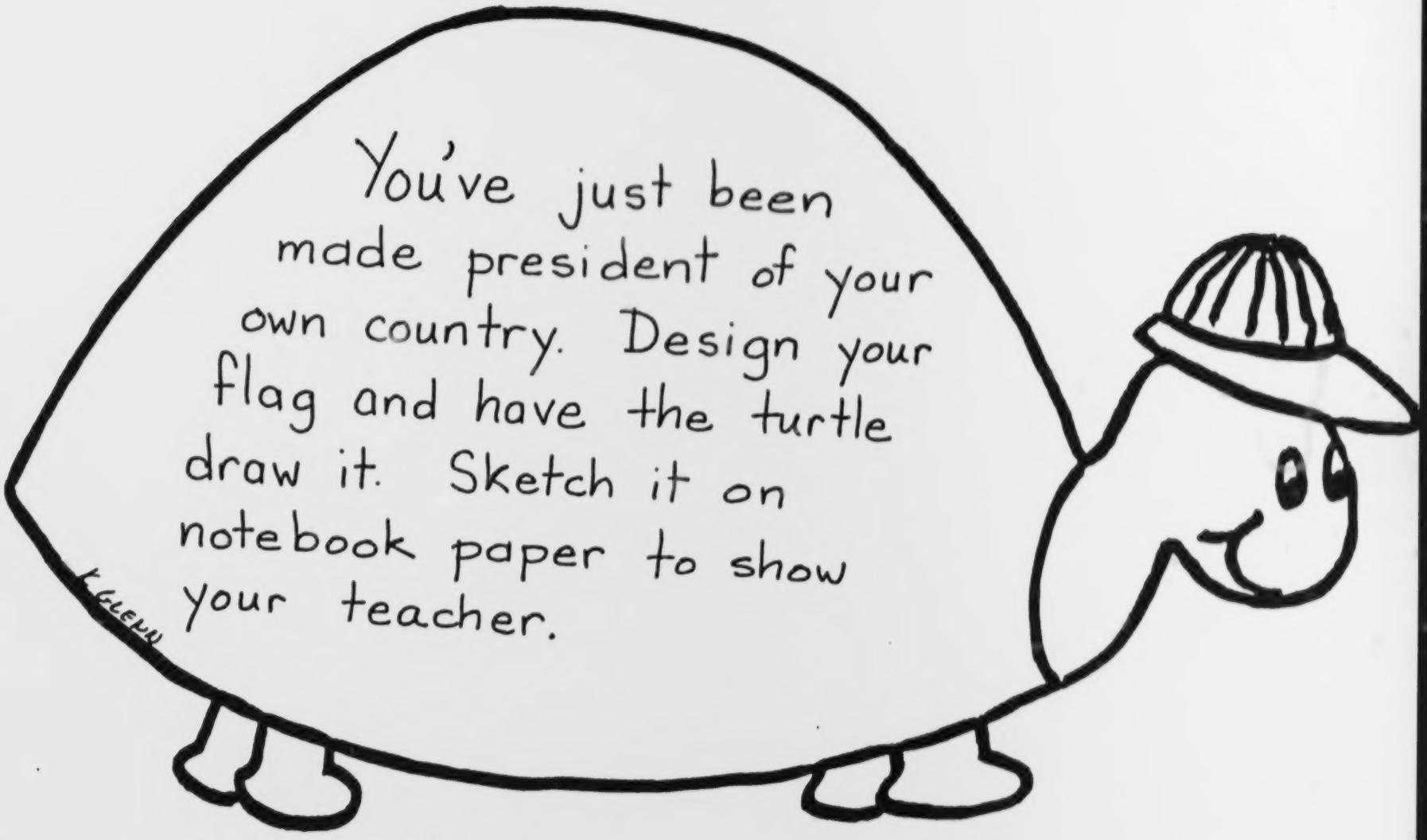
S-12


You've just been made president of your own country. Design your flag and have the turtle draw it. Sketch it on notebook paper to show your teacher.

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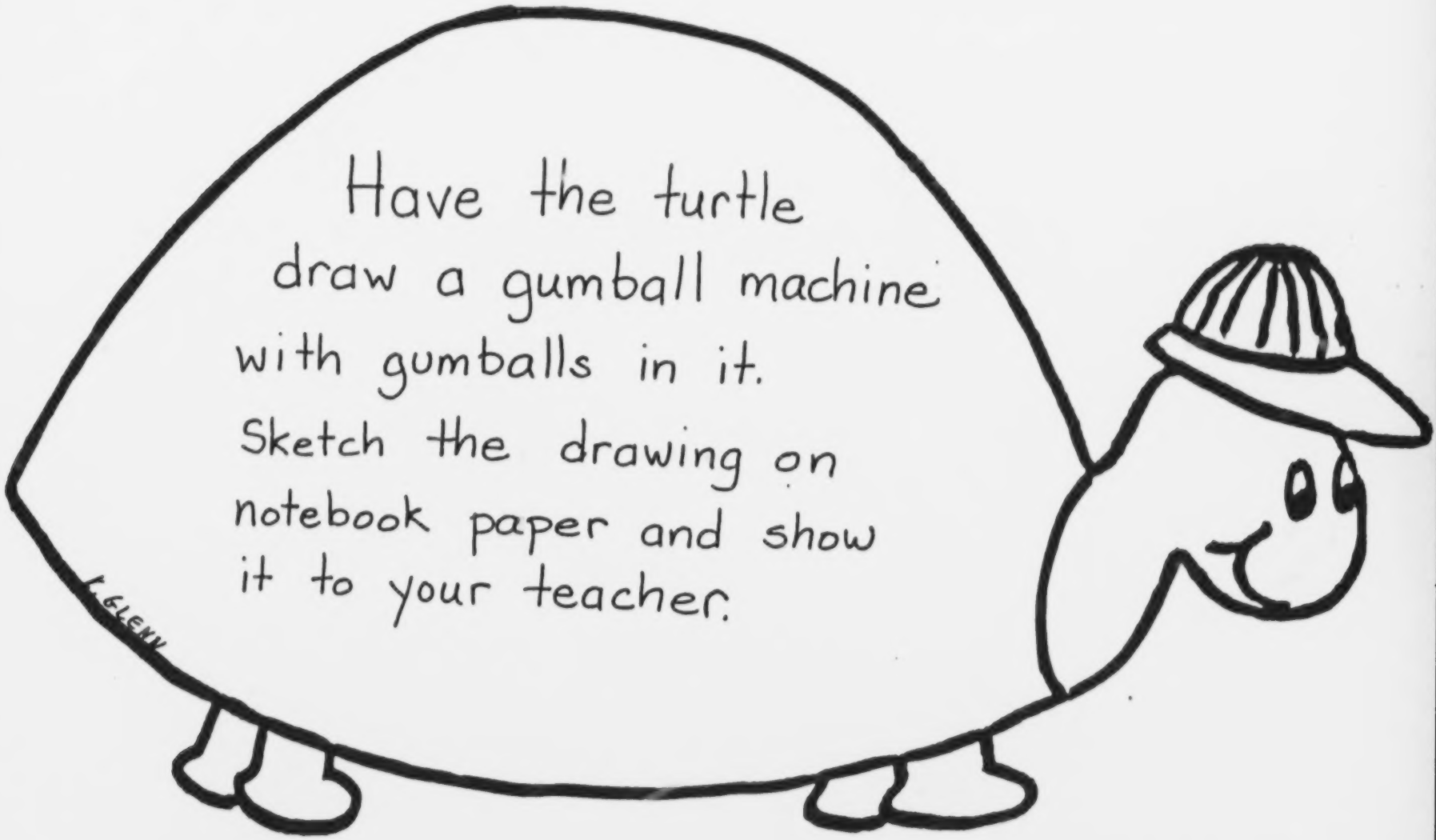

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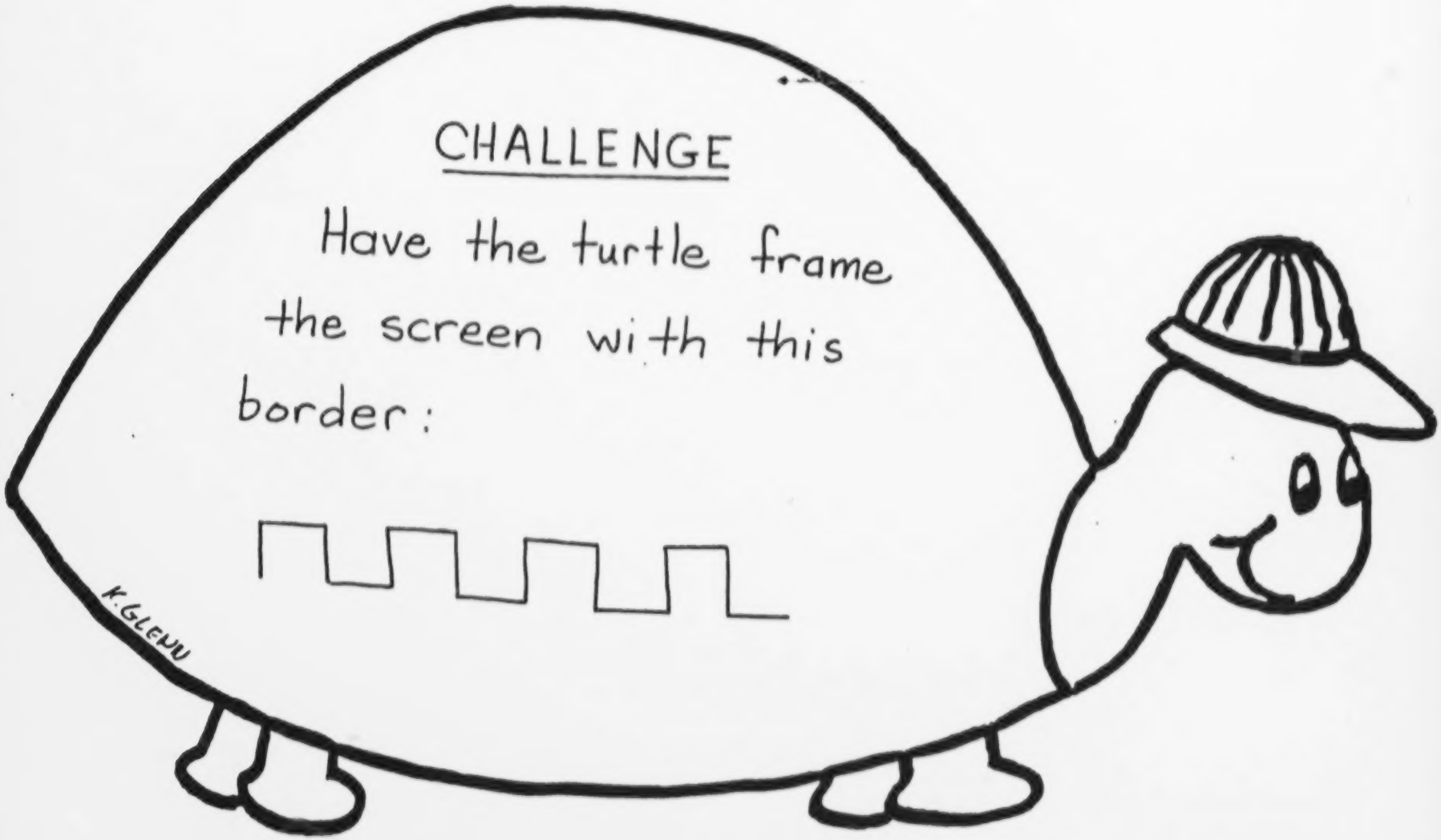

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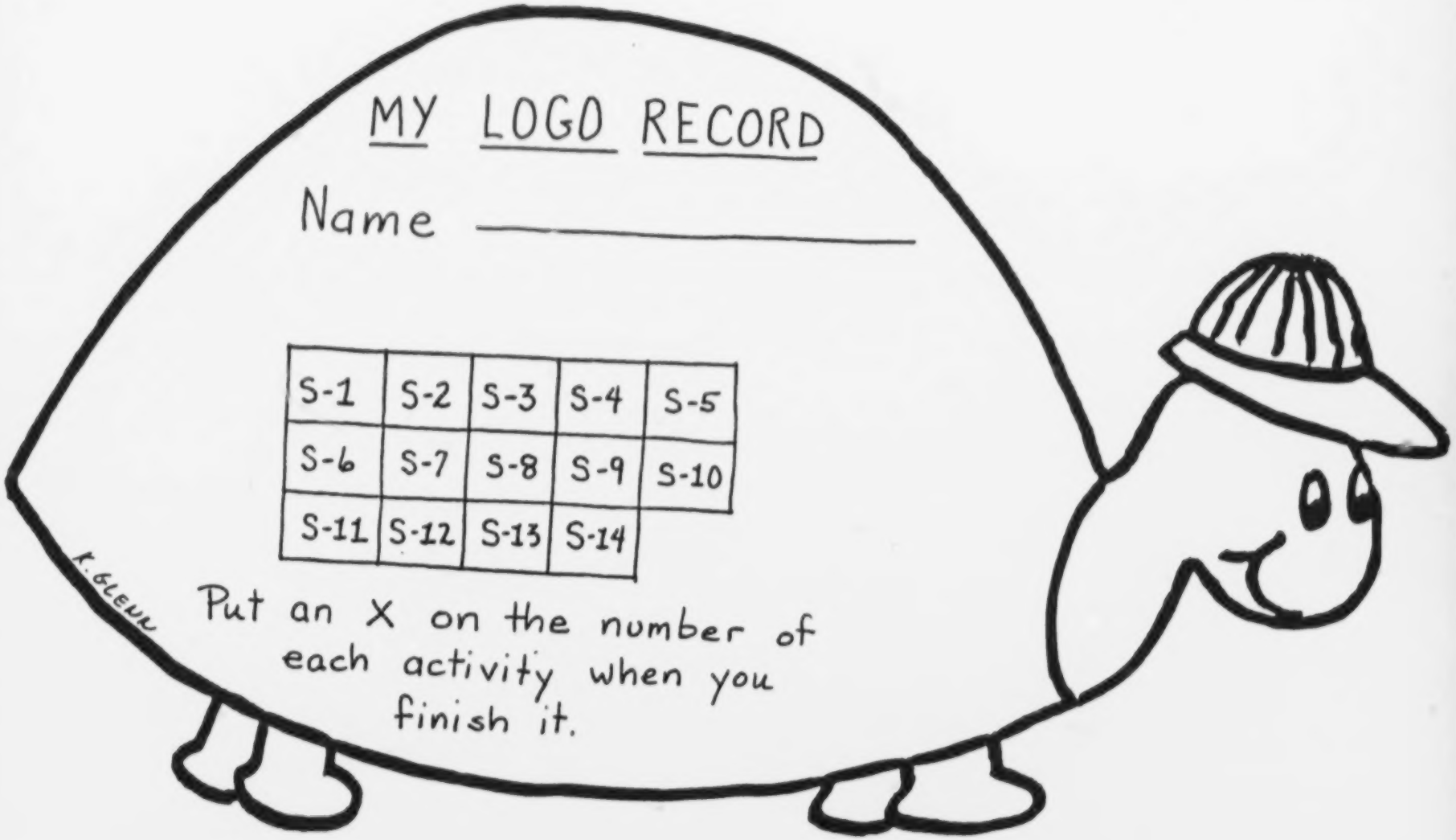

MY LOGO RECORD

Name _____

S-1	S-2	S-3	S-4	S-5
S-6	S-7	S-8	S-9	S-10
S-11	S-12	S-13	S-14	

Put an X on the number of each activity when you finish it.

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